



## Complete Summary

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### TITLE

Craniotomy: mortality rate.

### SOURCE(S)

AHRQ quality indicators. Guide to inpatient quality indicators: quality of care in hospitals - volume, mortality, and utilization [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 91 p.

AHRQ quality indicators. Inpatient quality indicators: technical specifications [version 3.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Feb 29. 37 p.

## Measure Domain

### PRIMARY MEASURE DOMAIN

Outcome

The validity of measures depends on how they are built. By examining the key building blocks of a measure, you can assess its validity for your purpose. For more information, visit the [Measure Validity](#) page.

### SECONDARY MEASURE DOMAIN

Does not apply to this measure

## Brief Abstract

### DESCRIPTION

This measure is used to assess the number of deaths per 100 discharges with a diagnosis-related group (DRG) code for craniotomy (DRG 001, 002, 528, 529, 530, and 543), with and without comorbidities and complications.

Risk adjustment for clinical factors, or at a minimum 3M™ All-Patient Refined Diagnosis-Related Groups (APR-DRGs), is recommended because of the confounding bias for craniotomy. In addition, little evidence exists supporting the construct validity of this indicator.

### RATIONALE

About 30% of personal health care expenditures in the United States go towards hospital care, and the rate of growth in spending for hospital services has only recently leveled out after several years of increases following a half a decade of declining growth. Simultaneously, concerns about the quality of health care services have reached a crescendo with the Institute of Medicine's series of reports describing the problem of medical errors and the need for a complete restructuring of the health care system to improve the quality of care. Policymakers, employers, and consumers have made the quality of care in U.S. hospitals a top priority and have voiced the need to assess, monitor, track, and improve the quality of inpatient care.

Craniotomy for the treatment of subarachnoid hemorrhage or cerebral aneurysm entails substantially high post-operative mortality rates. Better processes of care may reduce mortality for craniotomy, which represents better quality care.

Craniotomy is a complex procedure. Providers with high rates have better outcomes, although this may be an artifact of patient selection.

**Note:**

The following caveats were identified from the literature review for the "Craniotomy Mortality Rate" indicator:

- *Confounding bias<sup>b</sup>*: Patient characteristics may substantially affect the performance of the indicator; risk adjustment is recommended.
- *Unclear construct<sup>a</sup>*: There is uncertainty or poor correlation with widely accepted process measures.

Refer to the original measure documentation for further details.

**a** - The concern is theoretical or suggested, but no specific evidence was found in the literature.

**b** - Indicates that the concern has been demonstrated in the literature.

## **PRIMARY CLINICAL COMPONENT**

Craniotomy; mortality

## **DENOMINATOR DESCRIPTION**

All discharges, age 18 years and older, with Diagnosis-Related Group (DRG) code for craniotomy (DRG 001, 002, 528, 529, 530, and 543)

Exclude cases:

- With a principal diagnosis of head trauma
- Missing discharge disposition
- Transferring to another short-term hospital

**Note:** Refer to the Technical Specifications document for specific International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes.

## **NUMERATOR DESCRIPTION**

Number of deaths among cases meeting the inclusion and exclusion rules for the denominator

### **Evidence Supporting the Measure**

## **EVIDENCE SUPPORTING THE CRITERION OF QUALITY**

- One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

### **Evidence Supporting Need for the Measure**

## **NEED FOR THE MEASURE**

Variation in quality for the performance measured

## **EVIDENCE SUPPORTING NEED FOR THE MEASURE**

AHRQ quality indicators. Guide to inpatient quality indicators: quality of care in hospitals - volume, mortality, and utilization [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 91 p.

### **State of Use of the Measure**

## **STATE OF USE**

Current routine use

## **CURRENT USE**

External oversight/State government program  
Internal quality improvement  
Quality of care research

### **Application of Measure in its Current Use**

## **CARE SETTING**

Hospitals

## **PROFESSIONALS RESPONSIBLE FOR HEALTH CARE**

Physicians

## **LOWEST LEVEL OF HEALTH CARE DELIVERY ADDRESSED**

Single Health Care Delivery Organizations

**TARGET POPULATION AGE**

Age greater than or equal to 18 years

**TARGET POPULATION GENDER**

Either male or female

**STRATIFICATION BY VULNERABLE POPULATIONS**

Unspecified

**Characteristics of the Primary Clinical Component**

**INCIDENCE/PREVALENCE**

Unspecified

**ASSOCIATION WITH VULNERABLE POPULATIONS**

See "Burden of Illness" field.

**BURDEN OF ILLNESS**

Post-operative mortality rates are also relatively high, averaging nearly 14% for patients over age 65.

**EVIDENCE FOR BURDEN OF ILLNESS**

Taylor CL, Yuan Z, Selman WR, Ratcheson RA, Rimm AA. Mortality rates, hospital length of stay, and the cost of treating subarachnoid hemorrhage in older patients: institutional and geographical differences. J Neurosurg 1997 Apr;86(4):583-8. [PubMed](#)

**UTILIZATION**

Unspecified

**COSTS**

Unspecified

**Institute of Medicine National Healthcare Quality Report Categories**

**IOM CARE NEED**

Getting Better

## **IOM DOMAIN**

Effectiveness

### **Data Collection for the Measure**

## **CASE FINDING**

Users of care only

## **DESCRIPTION OF CASE FINDING**

Discharges, age 18 years or older, who had a craniotomy (see the "Denominator Inclusions/Exclusions" field)

## **DENOMINATOR SAMPLING FRAME**

Patients associated with provider

## **DENOMINATOR INCLUSIONS/EXCLUSIONS**

### **Inclusions**

All discharges, age 18 years or older, with diagnosis-related group (DRG) code for craniotomy (DRG 001, 002, 528, 529, 530, and 543)

**Note:** Refer to the Technical Specifications document for specific International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes.

### **Exclusions**

Exclude cases:

- With a principle diagnosis of head trauma
- Missing discharge disposition
- Transferring to another short-term hospital

## **RELATIONSHIP OF DENOMINATOR TO NUMERATOR**

All cases in the denominator are equally eligible to appear in the numerator

## **DENOMINATOR (INDEX) EVENT**

Institutionalization  
Therapeutic Intervention

## **DENOMINATOR TIME WINDOW**

Time window is a single point in time

## **NUMERATOR INCLUSIONS/EXCLUSIONS**

**Inclusions**

Number of deaths among cases meeting the inclusion and exclusion rules for the denominator

**Exclusions**

Unspecified

**MEASURE RESULTS UNDER CONTROL OF HEALTH CARE PROFESSIONALS, ORGANIZATIONS AND/OR POLICYMAKERS**

The measure results are somewhat or substantially under the control of the health care professionals, organizations and/or policymakers to whom the measure applies.

**NUMERATOR TIME WINDOW**

Institutionalization

**DATA SOURCE**

Administrative data

**LEVEL OF DETERMINATION OF QUALITY**

Not Individual Case

**OUTCOME TYPE**

Clinical Outcome

**PRE-EXISTING INSTRUMENT USED**

Unspecified

**Computation of the Measure****SCORING**

Rate

**INTERPRETATION OF SCORE**

Better quality is associated with a lower score

**ALLOWANCE FOR PATIENT FACTORS**

Analysis by subgroup (stratification on patient factors, geographic factors, etc.)

Case-mix adjustment

Risk adjustment method widely or commercially available

## DESCRIPTION OF ALLOWANCE FOR PATIENT FACTORS

Observed (raw) rates may be stratified by hospitals, age groups, race/ethnicity categories, sex, and payer categories.

Risk adjustment of the data is recommended using, at minimum, age, sex, and 3M™ All-Patient Refined Diagnosis-Related Groups (APR-DRGs)\*.

Application of multivariate signal extraction (MSX) to smooth risk adjusted rates is also recommended.

\***Note:** Information on the 3M™ APR-DRG system is available at [http://www.3m.com/us/healthcare/his/products/coding/refined\\_drq.jhtml](http://www.3m.com/us/healthcare/his/products/coding/refined_drq.jhtml).

## STANDARD OF COMPARISON

External comparison at a point in time

External comparison of time trends

Internal time comparison

### Evaluation of Measure Properties

## EXTENT OF MEASURE TESTING

Each potential quality indicator was evaluated against the following six criteria, which were considered essential for determining the reliability and validity of a quality indicator: face validity, precision, minimum bias, construct validity, fosters real quality improvement, and application. The project team searched Medline for articles relating to each of these six areas of evaluation. Additionally, extensive empirical testing of all potential indicators was conducted using the 1995-97 Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) and Nationwide Inpatient Sample (NIS) to determine precision, bias, and construct validity. Table 2 in the original measure documentation summarizes the results of the literature review and empirical evaluations on the Inpatient Quality Indicators. Refer to the original measure documentation for details.

## EVIDENCE FOR RELIABILITY/VALIDITY TESTING

AHRQ quality indicators. Guide to inpatient quality indicators: quality of care in hospitals - volume, mortality, and utilization [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 91 p.

### Identifying Information

## ORIGINAL TITLE

Craniotomy mortality rate (IQI 13).

## MEASURE COLLECTION

**MEASURE SET NAME**

[Agency for Healthcare Research and Quality \(AHRQ\) Inpatient Quality Indicators](#)

**DEVELOPER**

Agency for Healthcare Research and Quality

**FUNDING SOURCE(S)**

Agency for Healthcare Research and Quality (AHRQ)

**COMPOSITION OF THE GROUP THAT DEVELOPED THE MEASURE**

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicators are in the public domain and the specifications come from multiple sources, including the published and unpublished literature, users, researchers, and other organizations. AHRQ as an agency is responsible for the content of the indicators.

**FINANCIAL DISCLOSURES/OTHER POTENTIAL CONFLICTS OF INTEREST**

None

**ADAPTATION**

Measure was not adapted from another measure.

**RELEASE DATE**

2002 Jun

**REVISION DATE**

2008 Feb

**MEASURE STATUS**

This is the current release of the measure.

This measure updates previous versions:

- AHRQ quality indicators. Guide to inpatient quality indicators: quality of care in hospitals -- volume, mortality, and utilization [version 3.0]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Feb 20. 99 p.
- AHRQ quality indicators. Inpatient quality indicators: technical specifications [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 37 p.



## SOURCE(S)

AHRQ quality indicators. Guide to inpatient quality indicators: quality of care in hospitals - volume, mortality, and utilization [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 91 p.

AHRQ quality indicators. Inpatient quality indicators: technical specifications [version 3.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Feb 29. 37 p.

## MEASURE AVAILABILITY

The individual measure, "Craniotomy Mortality Rate (IQI 13)," is published in "AHRQ Quality Indicators. Guide to Inpatient Quality Indicators: Quality of Care in Hospitals -- Volume, Mortality, and Utilization" and "AHRQ Quality Indicators. Inpatient Quality Indicators: Technical Specifications." These documents are available in Portable Document Format (PDF) from the [Inpatient Quality Indicators Download](#) page at the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators Web site.

For more information, please contact the QI Support Team at [support@qualityindicators.ahrq.gov](mailto:support@qualityindicators.ahrq.gov).

## COMPANION DOCUMENTS

The following are available:

- AHRQ quality indicators. Inpatient quality indicators: software documentation, SAS [version 3.2]. 2008 Mar 10: Agency for Healthcare Research and Quality (AHRQ); 2008 Mar 10. 43 p. This document is available in Portable Document Format (PDF) from the [Agency for Healthcare Research and Quality \(AHRQ\) Quality Indicators Web site](#).
- AHRQ quality indicators. Software documentation: Windows [version 3.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Mar 10. 99 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#).
- Inpatient quality indicators (IQI): covariates, version 3.1. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 29 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#).
- Inpatient quality indicators (IQI): covariates (with POA), version 3.1. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 29 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#).
- Remus D, Fraser I. Guidance for using the AHRQ quality indicators for hospital-level public reporting or payment. Rockville (MD): Agency for Healthcare Research and Quality; 2004 Aug. 24 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#).
- AHRQ summary statement on comparative hospital public reporting. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2005 Dec. 1 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#).
- Guidance for using the AHRQ quality indicators for public reporting or payment - appendix A: current uses of AHRQ quality indicators and

- considerations for hospital-level reporting. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2005 Dec. A1-13 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#).
- Guidance for using the AHRQ quality indicators for public reporting or payment - appendix B: public reporting evaluation framework--comparison of recommended evaluation criteria in five existing national frameworks. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2005 Dec. B1-4 p. This document is available in PDF from the [AHRQ Quality Indicators Web site](#).
  - AHRQ inpatient quality indicators - interpretive guide. Irving (TX): Dallas-Fort Worth Hospital Council Data Initiative; 2002 Aug 1. 9 p. This guide helps you to understand and interpret the results derived from the application of the Inpatient Quality Indicators software to your own data and is available in PDF from the [AHRQ Quality Indicators Web site](#).
  - UCSF-Stanford Evidence-based Practice Center. Davies GM, Geppert J, McClellan M, et al. Refinement of the HCUP quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2001 May. 24 p. (Technical review; no. 4). This document is available in PDF from the [AHRQ Quality Indicators Web site](#).
  - HCUPnet. [internet]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2004 [accessed 2007 May 21]. [Various pagings]. HCUPnet is available from the [AHRQ Web site](#). See the related [QualityTools](#) summary.

## **NQMC STATUS**

This NQMC summary was completed by ECRI on December 4, 2002. The information was verified by the Agency for Healthcare Research and Quality on December 26, 2002. This NQMC summary was updated by ECRI on April 7, 2004, August 19, 2004, and March 4, 2005. The information was verified by the measure developer on April 22, 2005. This NQMC summary was updated again by ECRI Institute on August 17, 2006, on May 29, 2007, and again on October 20, 2008.

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